

**TRANSFER OF ALL WESTERN HEMISPHERE CYBALOMIINAE TO
OTHER SUBFAMILIES (CRAMBIDAE: PYRALOIDEA: LEPIDOPTERA):
ELUSIA SCHAU, *DICHOCHROMA* FORBES, *SCHACONTIA* DYAR,
CYBALOMIA EXTORRIS WARREN, AND *C. LOJANALIS* (DOGNIN)**

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Abstract.—Munroe (1995) included four genera and nine species from the Western Hemisphere in Cybalomiinae. The species were morphologically compared with *Cybalomia pentadalis* Lederer, the type species of *Cybalomia*, and all belong to other subfamilies. Accordingly, the following **new and revised combinations** and/or subfamilial assignments are proposed: *Elusia* Schaus is returned to Scopariinae; *Cybalomia extorris* Warren is transferred to *Aethiophysa* Munroe, *Dichochroma* Forbes and *Schacontia* Dyar are transferred to Glaphyriinae; and *Cybalomia lojanalis* (Dognin) is transferred to *Diptychophora* Zeller in Crambinae. A lectotype is designated for *Platytes lojanalis* Dognin. The adults and genitalia are figured for the first time.

Cybalomiinae contains 122 species, including those transferred here (Solis and Maes 2002) distributed in Europe, Africa, Asia and Australia (Munroe and Solis 1999). The known larvae feed on species of Brassicaceae (Luquet and Minet 1982) and Capparidaceae (Munroe and Solis 1998). The subfamily is defined by the following combination of characters: chaetosemata absent, concavity on the costa of the forewing present, fovea between Rs_{2+3} and Rs_4 present, forewing with Rs_4 in a non-apical position and a costal crescent present, and lateral indentations of sternite 2 present (Luquet and Minet 1982). Minet (1985) discussed and figured the morphology of cybalomiine tympanal organs. Depressions that form a “T” on sternite 2 posterior to the

tympanal organs are present. The chaetosemata are lacking in over 11 subfamilies of Crambidae (Solis and Maes 2002), and none of the species examined here share any of the other characters listed above for Cybalomiinae. This research examines the morphology and placement of four genera and nine species from the Western Hemisphere previously assigned to Cybalomiinae (Munroe 1995) (Table 1).

METHODS AND MATERIALS

Type specimens of included taxa were located (National Museum of Natural History (USNM), Washington, D.C.; Cornell Insect Collection (CUIC), Ithaca, New York; the Natural History Museum (BMNH), London, England), studied, and compared to *Cybalomia pentadalis* Lederer, the type species of *Cybalomia*. Many U.S. and European museums were

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Table 1. Cybalomiinae of the Western Hemisphere (Munroe 1995).

<i>Cybalomia</i> Lederer, 1863	
<i>extorris</i> Warren, 1892	
<i>quadristrigalis</i> (Fernald 1894) (<i>Metasia</i>)	Transferred to Glaphyriinae, <i>Aethiophysa</i> , new combination
<i>lojanalis</i> (Dognin 1905) (<i>Platytes</i>)	Transferred to Crambinae, <i>Diptychophora</i> , new combination . Lectotype designated for <i>Platytes lojanalis</i> .
<i>Elusia</i> Schaus, 1940	
<i>enalis</i> Schaus, 1940	Transferred to Scopariinae, revised combination
<i>Schacontia</i> Dyar, 1914	Transferred to Glaphyriinae, new combination
<i>chanesalis</i> (Druce, 1899) (<i>Pionea</i>)	
<i>replica</i> Dyar, 1914	
<i>medalba</i> (Schaus, 1904) (<i>Acontia</i>)	
<i>pfeifferi</i> Amsel, 1956	
<i>ysticalis</i> (Dyar, 1925) (<i>Thelcteria</i>)	
<i>Dichochroma</i> Forbes, 1944	
<i>muralis</i> Forbes, 1944	Transferred to Glaphyriinae, new combination

searched for additional material (especially the non-U.S. monotypic genera) to no avail. The lectotype designation is made in accordance with Article 74.7.3 (ICZN 1999) to preserve nomenclatural stability.

Genitalia were cleared with cold 10% KOH and dissected in water, stained with chlorozal black, and stored in glycerin until ready to be mounted in balsam. They were mounted on slides ventral side up. The phallus is small, so no attempt was made to inflate the vesica. Adults and genitalia and were photographed using the Microptics photoimaging system at the Systematic Entomology Laboratory (USDA) located at the USNM.

The placement of the studied taxa was determined by comparing their morphology with taxa in other subfamilies. For example, after *Cybalomia extorris* was hypothesized to be a glaphyriine, it was externally compared with all species in the Western Hemisphere using the USNM collection, the largest in the world, and photographs of type specimens in museums worldwide. Further comparisons were made with several genera using genitalic preparations at the USNM.

RESULTS AND DISCUSSION

The comparative morphological research shows that all of the species studied share characters with subfamilies other than the Cybalomiinae. *Elusia* Schaus is transferred to Scopariinae, and *Dichochroma* Forbes and *Schacontia* Dyar to Glaphyriinae. *Cybalomia extorris* Warren is transferred to *Aethiophysa* Munroe in Glaphyriinae, and *C. lojanalis* (Dognin) is transferred to *Diptychophora* Zeller in Crambinae.

It should be noted that these species are highly derived and often differ from the expected character states of other subfamilies, and some have the external "gestalt" or a similar habitus to Cybalomiinae. I surmise that this was the reason they were relegated to Cybalomiinae (i.e., the taxon became a "dump" subfamily for New World species of Crambidae of uncertain affinities).

Cybalomia extorris Warren, 1892 (Figs. 1, 8–11)

Placement history.—*Cybalomia* [sic] *extorris* was described in Pyralidae based on two males collected by Lord Walsingham from the western United States; no

exact locality was given. Munroe (1995) stated that the species was originally described in *Hypolais* Guenée, but this was an error. The synonym *C. quadristrigalis* Fernald (1894) was described in *Metasia* Guenée from California.

Species comparison and placement.—Externally, *C. extorris* is most similar to species of *Aethiophysa* Munroe in Glaphyriinae. Munroe (1964) did not elaborate which characters defined Glaphyriinae, but Munroe and Solis (1999) described the subfamily as: ocelli present, chaetosemata absent, and a three-segmented labial palpus porrect. In addition, *C. extorris* and species in *Aethiophysa* share a tuft of scales on the second labial palpal segment and the presence of white postmedial and medial lines on the forewings. *Cybalomia extorris* has a light brown basal color in both wings, in contrast to species in *Aethiophysa* that have a bright yellow basal color or a light brown color in the forewing only and the hindwing mostly white. I hereby transfer *C. extorris*, and its synonym *C. quadristrigalis*, to *Aethiophysa* Munroe (1964) (Glaphyriinae), **new combinations**. Because of the external and internal differences with many glaphyriines, this species may require a new genus in the course of a greatly needed subfamilial phylogenetic study.

Genitalic morphology within glaphyriine genera is unusually variable (Munroe 1964, Solis and Adamski 1998) in comparison to other crambid subfamilies where it tends to be conservative. The highly modified genitalia of *C. extorris* differ considerably from other species in *Aethiophysa*. The male has a very thin valva, and the female has a long ductus bursae with a small round signa in the corpus bursae. Males of *Aethiophysa* have broad valvae, and females have a short ductus bursae with striations and a heavily spinose corpus bursae throughout.

The tympanal organs place *C. extorris* in Glaphyriinae. The bulla tympani are

broad, and wider than long, and the processus tympani are prominent. Secondary venulae are present in *C. extorris* as in other species of *Aethiophysa*. Most glaphyriines have a fornix tympani that is weakly sclerotized and round, but *C. extorris* differs in having a fornix tympani that is sclerotized and square. The ramus tympani is sclerotized and prominent in *C. extorris* but not in other species of *Aethiophysa* and Glaphyriinae.

Material examined.—The two syntypes of *C. extorris* were examined and one was photographed at the BMNH. Specimens at the USNM from the following localities were examined: Arizona: Mojave County. California: Argus Mts., Surprise Canyon. Colorado: Glenwood Springs, Denver. Nevada: Charles-town Mtns. Texas: Fort Davis, Davis Mt. St. Pk, Agula Canyon, Smith Canyon. Utah: Richfield, Springdale, Stockton, Cedar City.

Cybalomia lojanalis (Dognin 1905)
(Figs. 2–3, 12–16)

Placement history.—*Cybalomia lojanalis* was described from a series of males (but see below) from Loja, Ecuador, by Dognin in *Platytes* (Crambinae). It was transferred by Bleszynski and Collins (1962) to Pyraustidae ["Referable to Pyraustidae"] without explanation or generic assignment. Munroe (1995) placed it in *Cybalomia*, but stated it was misplaced in this genus. Munroe (1995) in Note #23 stated, "M. Shaffer (BMNH) has pointed out to me that this species has cybalomiine wing pattern, external characters, and genitalia. Although it will undoubtedly require a new genus, I place it for the time being in *Cybalomia*." In the BMNH catalog, captured in LepIndex [<http://www.nhm.ac.uk/entomology/lepindex>] (Beccaloni et al. 2003), the species is incorrectly placed in *Ptychopseustis* Meyrick, an Old World cybalomiine genus.

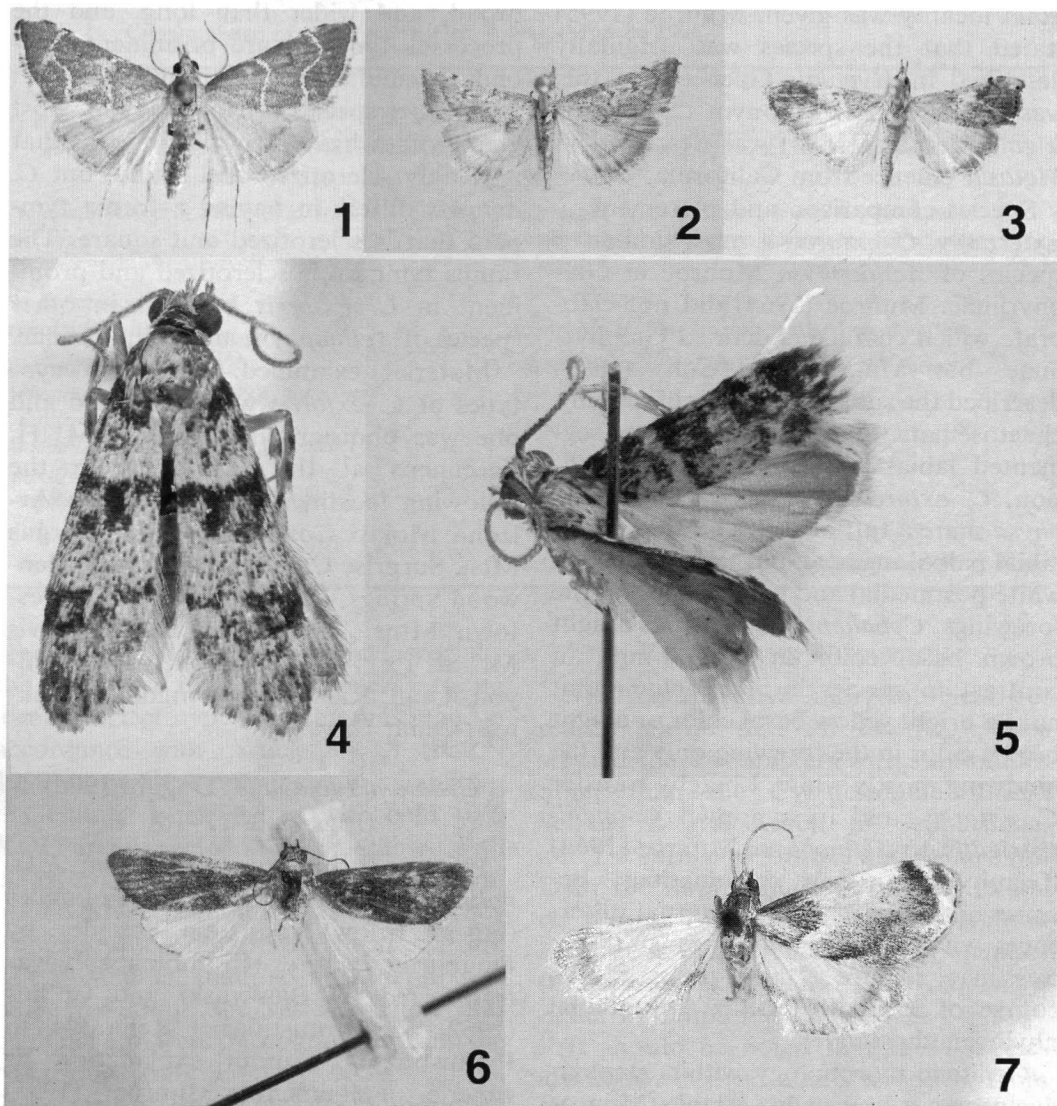


Fig. 1. *Cybalomia extorris* Warren, 1892, Davis Mtns., Texas. Fig. 2. *Cybalomia lojanalis* Dognin, female, Loja, Ecuador, Paralectotype, USNM. Fig. 3. *Cybalomia lojanalis* Dognin, male, Loja, Ecuador, Lectotype, USNM. Fig. 4. *Elusia enalis* Schaus, Luquillo Forest, Puerto Rico, USNM. Fig. 5. *Elusia enalis* Schaus, El Yunque, Luquillo Mts., Puerto Rico, Holotype, USNM. Fig. 6. *Dichochroma muralis* Forbes, Amotape Mtns., N.W. Peru, Holotype, CIUC. Fig. 7. *Schacontia replica* Schaus, Cordoba, Mexico, Holotype, USNM.

Species comparison and placement.— Examination of the type series at the USNM and dissection of abdomens indicates that the type series includes both males and females and that it is a member of Diptychophorini (Crambinae). Diptychophorini includes seven genera (Gaskin 1986a, 1986b, 1989) defined by highly

derived elements of the genitalia, and are in great need of revision in the Western Hemisphere (Landry 1990). *Cybalomia lojanalis* has some of the characters currently used to define several genera, including some genera not of the Diptychophorini, so I conservatively transfer this species to *Diptychophora* Zeller, as *D.*

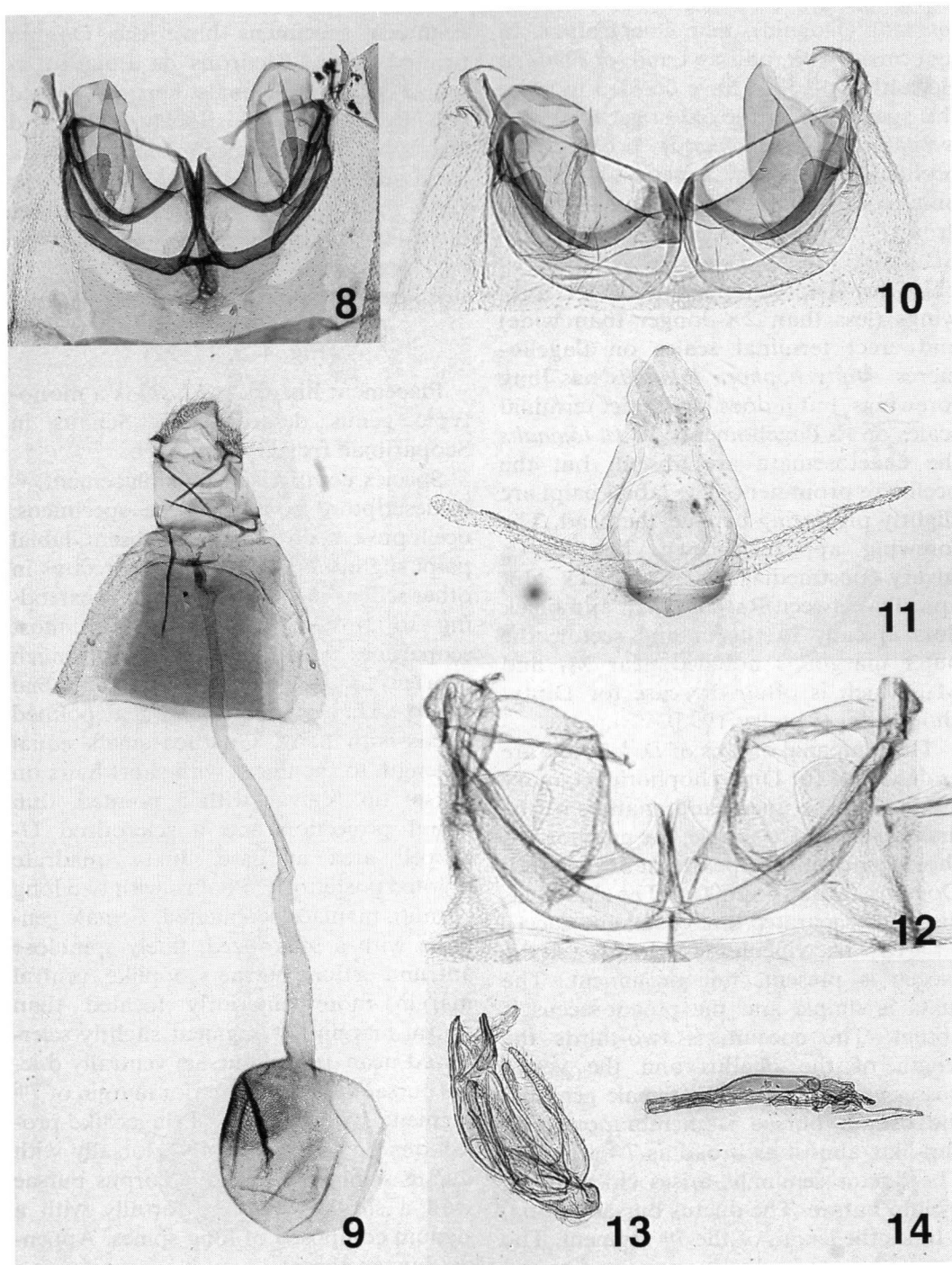


Fig. 8. *Cybalomia extorris* Warren, female, tympanal organs. Fig. 9. *Cybalomia extorris* Warren, female, genitalia. Fig. 10. *Cybalomia extorris* Warren, male, tympanal organs. Fig. 11. *Cybalomia extorris* Warren, male, genitalia, no phallus. Fig. 12. *Cybalomia lojanalis* Dognin, male, tympanal organs. Fig. 13. *Cybalomia lojanalis* Dognin, male, genitalia. Fig. 14. *Cybalomia lojanalis* Dognin, male, phallus.

lojanalis (Dognin), **new combination**. In agreement with, and as Landry (1990) so elegantly stated, "I have decided to place this species under the oldest generic name available (*Diptychophora*) because the proliferation of new generic names can only confuse the classification of this group."

Landry (1995) gave two synapomorphies for Diptychophorini: short forewings (less than $2\times$ longer than wide) and erect terminal scales on flagellomeres. *Diptychophora lojanalis* has long forewings, but it does have erect terminal scales on its flagellomeres. In *D. lojanalis* the chaetosemata are absent, but the ocelli are prominent. The labial palpi are slightly projecting beyond the head. The forewing appears brown, but has a silvery postmedial line, a black dot apically between Rs_3 and Rs_4 , and black dots apically in the cubital sector; the outer margin is notched near M_1 and M_3 , which is often the case for Diptychophorini (Landry 1995).

The tympanal organs of *D. lojanalis* are as described for Diptychophorini (Landry 1995: 67). The uncus and gnathos of the male genitalia are simple; the gnathos has short spines at the apex as in *Micrelephas* Dognin (Landry 2000). The valva is distinctly separated into costal and saccular areas. The vinculum is narrow, and the saccus is present, not prominent. The juxta is simple and the pseudosaccus is absent. The coecum is two-thirds the length of the phallus and the vesica possesses cornuti. In the female genitalia the ostium bursae is membranous and cup-like, almost as broad as 7th segment. The ductus seminalis arises close to the ostium bursae. The ductus bursae is long, 3 times the length of the 7th segment. The corpus bursae is membranous and round without signa.

Material examined.—Dognin (1905) stated that he had a series of males in the original description. The type series includes both males and females.

Eighteen specimens have the Dognin printed label "Environs de Loja/Equateur/87 (Lectotype, male, here designated (USNM), bearing this locality label and lectotype label)," 3 specimens also have a handwritten label with "*Platytes lojanalis* Dgn. Type" and several more specimens have labels with the handwritten name by Dognin, but not the word "Type."

Elusia enalis Schaus, 1940

(Fig. 4–5, 17–22)

Placement history.—*Elusia* is a monotypic genus described by Schaus in Scopariinae from Puerto Rico.

Species comparison and placement.—Redescription from the type specimens: ocelli present, chaetosemata absent, labial palpi slightly upturned (not porrect as in other scopariines), maxillary palpi extending to tip of labial palpi (in most scopariines the maxillary palpi are much shorter and do not reach tip of labial palpi). Male genitalia with a pointed uncus with hairs. Gnathos small, equal in length to the uncus with short hairs on dorsal tip. Valvae with a pointed, thin costal projection and a sclerotized U-shaped area at base. Juxta quadrate pointed posteriorly. Phallus with two long cornuti, maniacas scobinated. Female genitalia with a sclerotized, finely spinulose antrum; ostium bursae scooplike, ventral margin more anteriorly located than dorsal margin; 7th segment slightly sclerotized near ostium bursae; ventrally ductus bursae at level of anterior margin of 7th segment, with two lateral finger-like projections or diverticula, and dorsally with ductus seminalis; ventrally corpus bursae with a slit-like signum, dorsally with a signum composed of long spines. Appendix bursae absent.

I transfer *Elusia enalis* Schaus back to Scopariinae, **revised combination**. Examination and dissection of the type specimen and dissection of additional material indicate that *E. enalis* Schaus is a

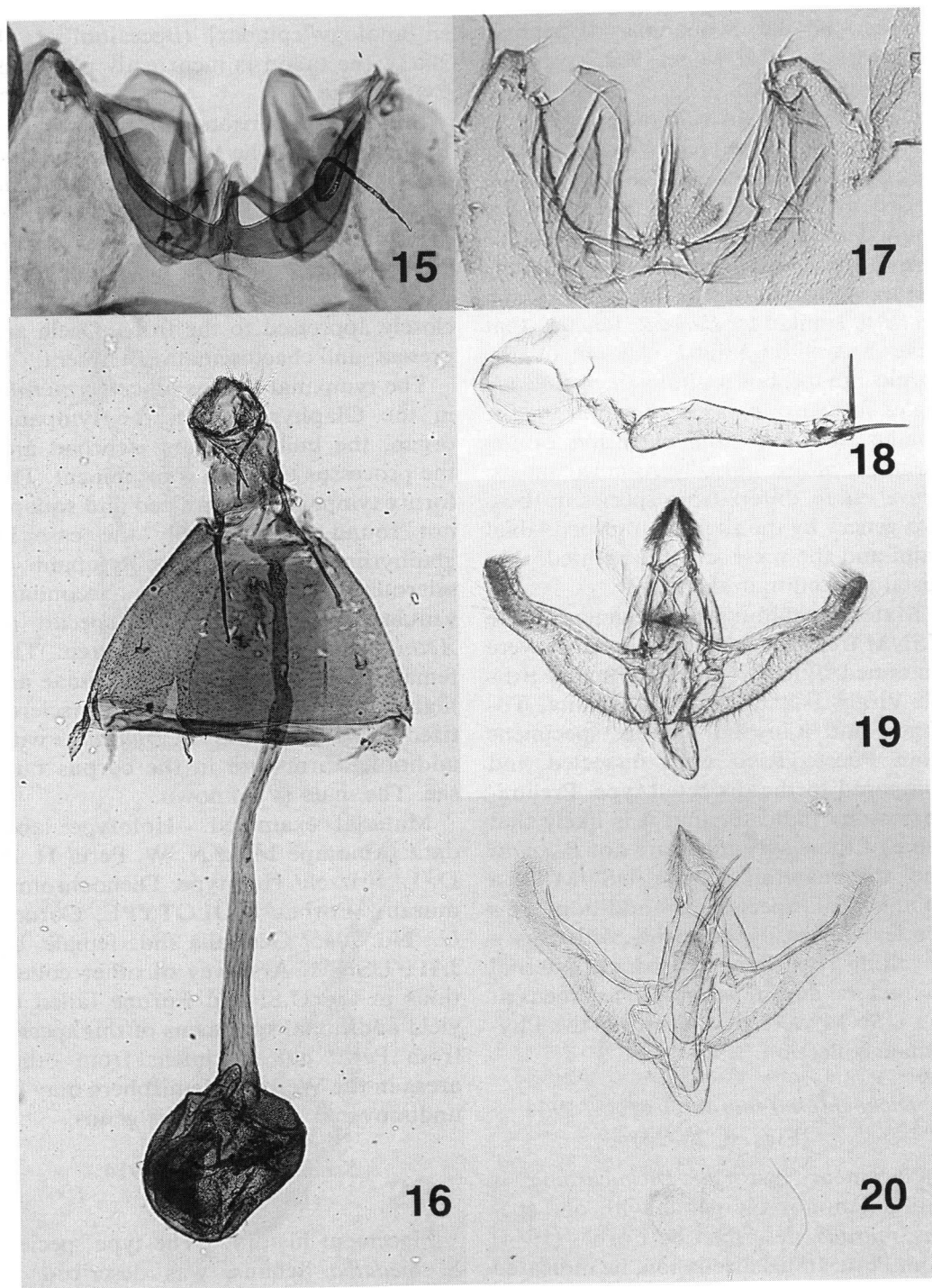


Fig. 15. *Cybalomia lojanalis* Dognin, female, tympanal organs. Fig. 16. *Cybalomia lojanalis* Dognin, female, genitalia. Fig. 17. *Elusia enalis* Schaus, male, tympanal organs. Fig. 18. *Elusia enalis* Schaus, male, phallus. Fig. 19. *Elusia enalis* Schaus, male, genitalia. Fig. 20. *Elusia enalis* Schaus, El Yunque, Luiquillo Mts., Puerto Rico, Holotype, genitalia with phallus still in place.

member of the Scopariinae (Chapman 1912, Munroe 1972, Minet 1982, Yoshiyasu 1985, Nuss 1998).

Elusia enalis shares characters with two major genera in the New World, *Scoparia* Haworth and *Eudonia* Billberg as discussed by Nuss (1998). It has a distally pointed uncus and cornutus of the phallus like *Scoparia*, but it does not have the distal extension of the sacculus. *Elusia enalis* is similar to *Eudonia* females that have a well-developed signum in the corpus bursae, but it differs from *Eudonia* males because it lacks cornuti in the phallus, no free distal extension of the sacculus, and a dorsally rounded uncus. *Elusia enalis* differs from species in these two genera by the slightly upturned labial palpi and the presence of a pointed, thin costal projection in the valvae.

Material examined.—Specimens at the USNM from the following localities were examined: Puerto Rico, Dominica, British Virgin Islands, French Guiana, Tobago, and Guyana. Seven specimens from Puerto Rico were dissected and compared to the dissected type. Preliminary study indicates that it is likely that some of these specimens are not *E. enalis* and the material at the USNM is a complex of species. In addition, this species can easily be misidentified as a phycitine (Pyrilidae) based on external characters, and most of the specimens at the USNM were discovered in the Phycitinae collection.

Dichochroma muralis Forbes, 1944
(Figs. 6, 23–24)

Placement history.—*Dichochroma* is another monotypic genus with one species, *muralis*, described by Forbes (1944) from Peru. In his discussion, he indicated that it differs from known Pyraustinae and compares it with species of *Dichogama* and states that *D. muralis* “is clearly a development of *Dichogama*,....” In LepIndex [<http://www.nhm.ac.uk/>

entomology/lepindex] (Beccaloni et al. 2003), the taxon is incorrectly placed in Pyraustinae.

Species comparison and placement.—Examination of the holotype female and study of the dissected genitalia indicate that *Dichochroma* is a member of the Glaphyriinae based on the tympanal organs and head structures. The head is descaled with a three-segmented labial palpus closely appressed to the frons. Ocelli are present, and chaetosemata are absent.

The tympanal organs place *D. muralis* in the Glaphyriinae. In the tympanal organ, the bulla tympani is broad and the processus tympani is prominent. The fornix tympani is sclerotized and square, not round as is usually the case in glaphyriines. The ramus tympani is sclerotized and prominent. Secondary venulae are present as in species of *Aethiophysa* and *Eupoca* Warren. The female genitalia of the Glaphyriinae are highly derived, but most have a sclerotized collar as does *D. muralis*, with additional armature in the corpus bursae. The male is unknown.

Material examined.—Holotype label data: Amotape Mts., N. W. Peru/ H. & D. L. Frizzell/ Holotype, *Dichochroma muralis*, Forbes/ HOLOTYPE, Cornell U., No. 7045/ Genitalia slide female, by JAL, USNM. A survey of other collections in the U.S. and Europe failed to yield additional specimens of this species from Peru, but specimens from other areas in the Western Hemisphere may be undiscovered species in this genus.

Schacontia Dyar, 1914
(Figs. 7, 25–29)

Placement history.—The type species, *S. medalba* Schaus, was described in Schoenobiinae, subsequently transferred to Epipaschiinae by Munroe (1958), and finally transferred to Cybalomiinae by Munroe (1995), with the note “subfamily placement tentative.”

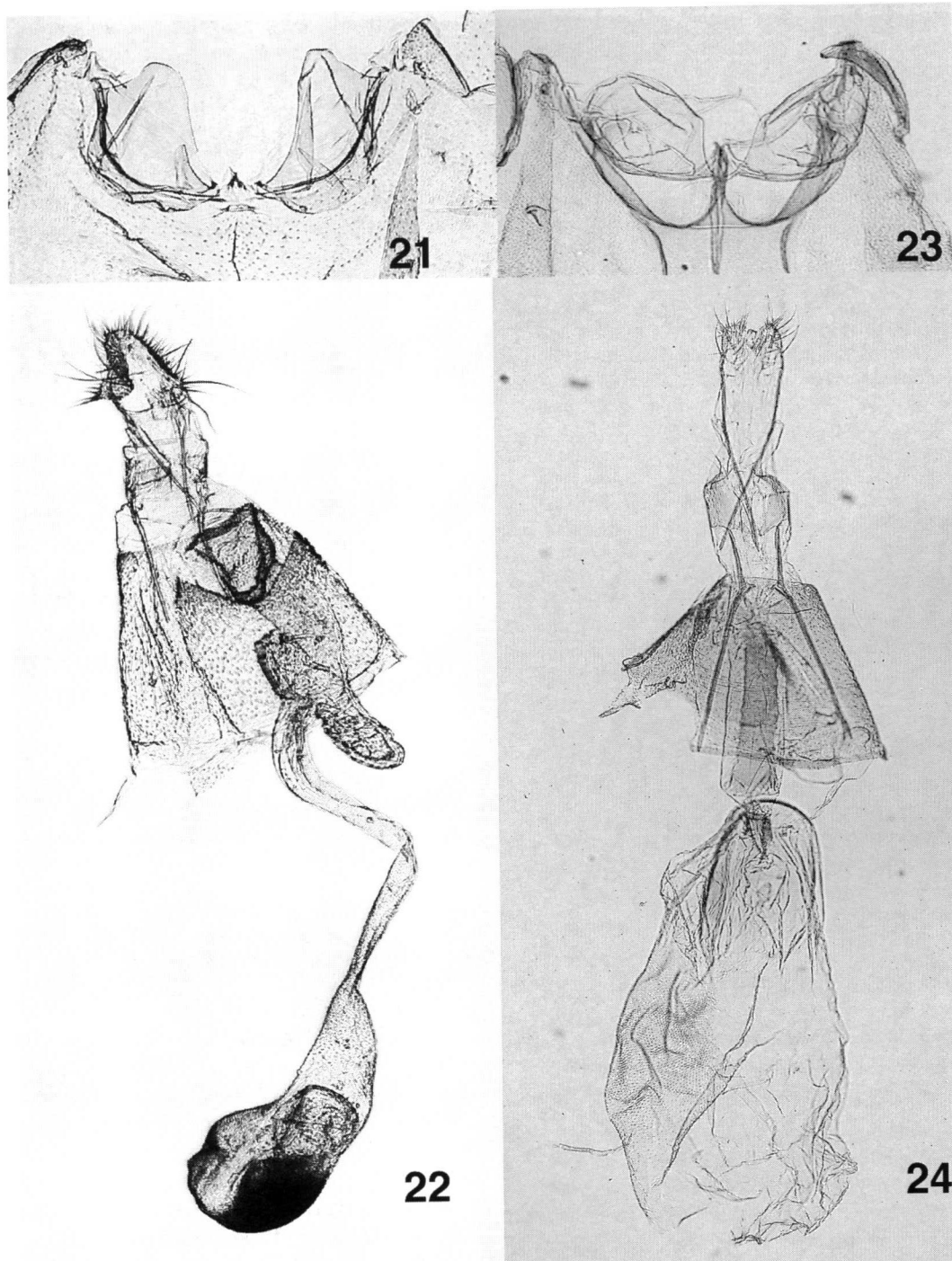


Fig. 21. *Elusia enalis* Schaus, female, tympanal organ. Fig. 22. *Elusia enalis* Schaus, female, genitalia. Fig. 23. *Dichochroma muralis* Forbes, female, tympanal organ. Fig. 24. *Dichochroma muralis* Forbes, female, genitalia.

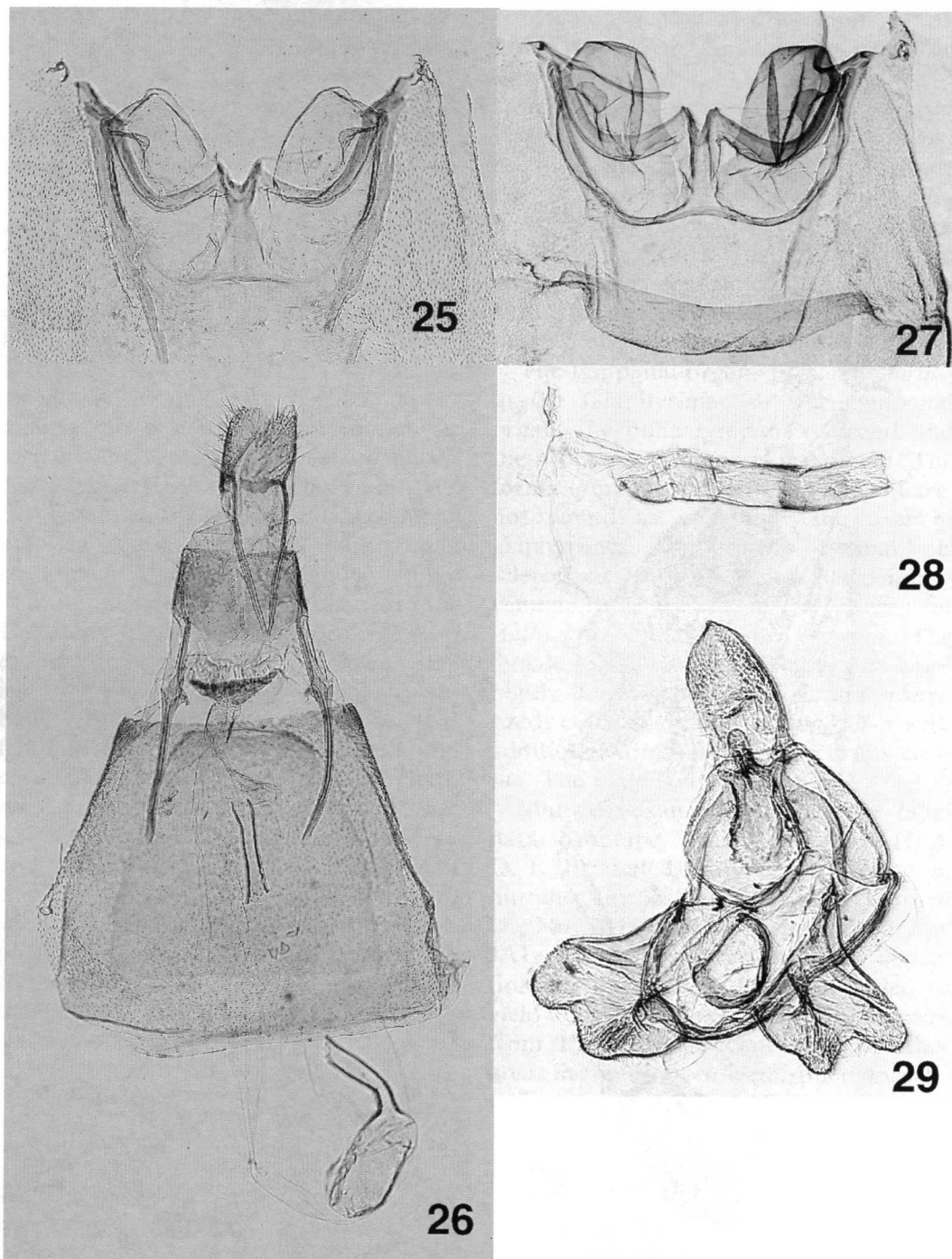


Fig. 25. *Schacontia replica* Schaus, female, tympanal organ. Fig. 26. *Schacontia replica* Schaus, female, genitalia. Fig. 27. *Schacontia pfeifferi* Amsel, male tympanal organ. Fig. 28. *Schacontia pfeifferi* Amsel, male phallus. Fig. 29. *Schacontia pfeifferi* Amsel. Male genitalia.

Species comparison and placement.—The moths are small and shiny with a very subtle wing pattern. *Schacontia replica* Schaus is figured here because the pattern is more prominent than in the holotype of *S. medalba*. The external morphology, genitalia, and, most convincingly, the tympanal organs indicate that *Schacontia* is a member of the Glaphyriinae. The bulla tympani are broad, wider than long, and the processus tympani are prominent. Most glaphyriines have a fornix tympani that is weakly sclerotized and round; in species of *Schacontia* the fornix tympani is sclerotized and square, and secondary venulae are present as in species of *Aethiophysa*. The ramus tympani is sclerotized and prominent in species of *Schacontia* but not in other species of *Aethiophysa* and Glaphyriinae.

Schacontia Dyar currently comprises five species from Central and South America (Munroe 1995). Study of this genus, with descriptions of several new species and their immatures reared in Costa Rica, is on-going.

Material examined.—The type species, *S. medalba*, was examined as well as all the type specimens of the five species listed in Table 1.

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